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ABSTRACT

Manufacturing in Australia is a large and diverse industry, employing more than 1.1 million people. Despite its decline in relative importance (from providing 16.3% of jobs to providing 13.4%), it is still the second largest employing industry. Manufacturing makes up the major component of exports, accounting for 51 percent in 1994-95. Over the last decade, some subdivisions, especially metal products, have shown little employment growth. Sizable drops in employment have occurred in textiles, clothing and footwear, and machinery and equipment. Based on its occupational profile, manufacturing is substantially more reliant on the vocational education and training (VET) sector for its skill requirements than most industries. Its qualifications profile shows its skills are concentrated in the skilled vocational area. In the trades area, major declines have occurred in metal fitting and machining, vehicle, electrical, building, printing, and other metal trades. Significant rises in trades employment have occurred in welding, screen printing, baking and pastry cooking, wood machining, other wood trades, upholstering and bedding, and garment trades where skill shortages are most likely. About 90 percent of jobs are full time. Manufacturing is concentrated in New South Wales and Victoria. VET graduates generally rated the quality and relevance of their VET courses quite highly. Upon graduation, 73.4 percent of graduates had a job. Manufacturing is one of three main employers of apprentices. (Appendix includes six tables and three charts.) (YLB)

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Industry training monograph

NCVER

Manufacturing

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Industry training monograph

Manufacturing

1998

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Preface

THE MANUFACTURING INDUSTRY training monograph is one of a series of monographs which has been designed to provide readers with an overview of occupational trends and the current training effort in each industry in Australia.

The monograph analyses data at the major Australian and New Zealand Standard Industry Classification (ANZSIC) industry division level, given that it is at this level most data are collected and disseminated. The monograph addresses:

- recent employment trends
- recent occupational trends in key skills areas
- current training arrangements, particularly training levels and outputs

The monographs bring together for the first time a range of survey data from the Australian Bureau of Statistics (ABS), together with graduate destination, employer satisfaction with training and other training data compiled for the Australian National Training Authority (ANTA) by the National Centre for Vocational Education Research (NCVER).

I would like to thank Tom Dumbrell for preparing these monographs and I would also like to acknowledge John Ray's contribution to the analysis of employment and occupation data.

NCVER acknowledges ANTA's significant contribution to the cost of this monograph in sponsoring its publication.

I hope that the material in this publication will be of interest to Australia's vocational, education and training (VET) sector. In particular the document is designed for industry decision-makers, policy-makers, teachers and trainers, researchers and students with an interest in VET.

Readers who are interested in more information about training markets or other areas of VET research are referred to the NCVER's research database, VOCED. Printed and diskette versions of VOCED can be obtained from NCVER (ph +61 8 8333 8400) or it can be accessed directly on the world wide web at the following address:

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Chris Robinson, National Centre for Vocational Education and Research Ltd

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The manufacturing industry in Australia

Overview

EMPLOYMENT IN MANUFACTURING in Australia currently accounts for about 13.4% of jobs.[1] Ten years earlier, manufacturing accounted for 16.3% of total employment. The total number of jobs in manufacturing over the last ten years has fallen, however, by only a small amount—about 40 000 jobs, or by less than 3%. Its declining percentage share of jobs is attributable to the faster rate of growth in the services sector of the economy.

During the course of the last hundred years, manufacturing's significance, both as a provider of jobs and as a contributor to national gross domestic product (GDP), rose to a peak during the 1950s and 1960s, and has since declined in relative significance. Since the early 1970s manufacturing's share of national GDP has fallen from about 24% to around 15%. In the early 1970s manufacturing also accounted for about 25% of all Australian jobs. Despite the industry's decline in relative importance, manufacturing is still the second largest employing industry in Australia, behind retailing, with more than 1.1 million persons working in manufacturing.

The industry is very diverse, with some of the more significant components of the industry, in terms of employment, being machinery and equipment; food, beverages and tobacco; metal products; and printing, publishing and recorded media. Each of these sub-divisions of the industry employs more than 120 000 persons throughout Australia.

Despite the decline in manufacturing's share of employment, its actual level of employment has fallen over the last 30 years by only about 120 000. Within the industry, some sub-divisions have grown quite strongly over recent years, while others have lost a disproportionate share of jobs. After dropping markedly from the late 1980s, employment in manufacturing has shown positive growth since the early 1990s. (See chart 3.1 at end of this section.)

[1] Australian Bureau of Statistics (ABS), *Labour force, Australia*, cat.6203.0, November 1997

Manufacturing is one of the major customers of the vocational education and training (VET) sector in Australia. About 36% of those working in manufacturing have some form of VET qualification. Manufacturing is a relatively insignificant destination for university graduates, with only about 9% of its employees having a bachelor's degree or higher award compared to about 17% of all employed persons in Australia. More than half (about 54%) of the workers in manufacturing have no formal post-school qualifications, compared with about 49% for the workforce as a whole.

Manufacturing is an important employment destination for young people, with almost 10% of workers aged between 15–19 finding jobs in this industry. While retailing is by far the most significant employment destination for young people, accounting for almost half of all jobs for teenagers, these are predominantly part-time and casual jobs. Manufacturing's continued support of apprenticeships means it is a numerically significant source of jobs, especially jobs with structured training, for young people, especially for young males.

At the survey on employer satisfaction with vocational education and training for 1997 (ESS), compiled by the National Centre for Vocational Education Research (NCVER), manufacturing employers showed a relatively high level of satisfaction with VET provision, scoring it at 6.8 on a 10-point scale. This placed manufacturing in the top half of industries in terms of satisfaction with VET. This was almost identical to the score recorded in the 1995 ESS. Nevertheless, at the 1995 survey, 42% of manufacturing employers still believed that VET was not providing skills relevant to current employer needs.

The technical and further education (TAFE) graduate destination survey for 1997 (GDS), also compiled by the NCVER, reinforced the importance of manufacturing as a destination for VET graduates. At that survey, manufacturing was the third major destination industry for VET graduates, behind health and community services—which had risen sharply from third in 1995 to being the major destination for VET graduates in 1997—and retailing. In 1997, 13.2% of all employed VET graduates surveyed were working in manufacturing, 83% of them on a full-time basis.

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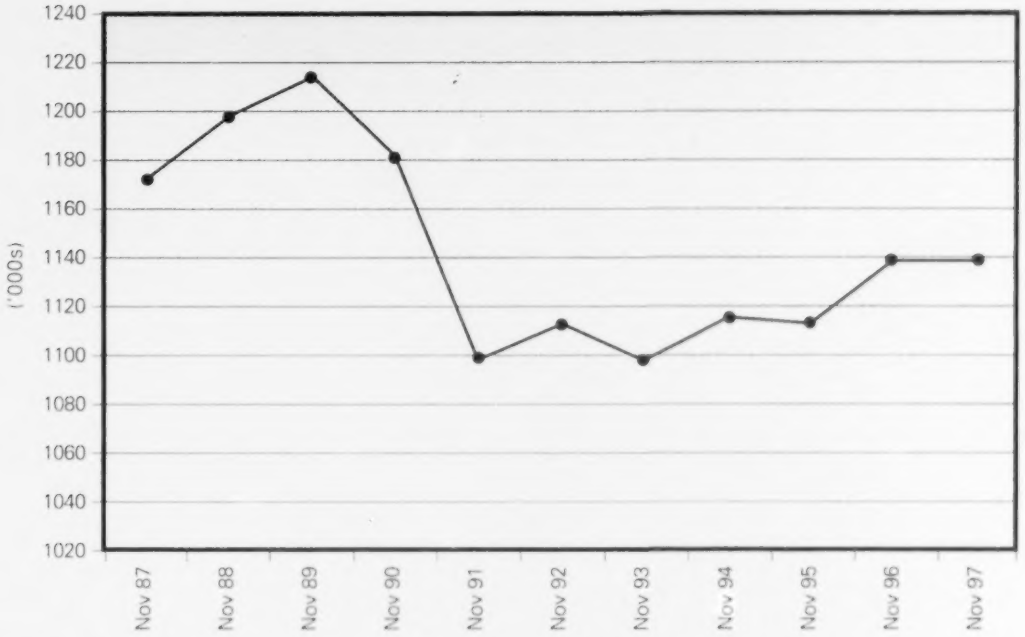
Of those graduates surveyed who were working in their final semester in manufacturing, 63% received some form of financial support from their employer, mainly in the form of paid fees and paid time off work. This was well above the all-industry average for employer support of around 51%. Graduates in manufacturing who were working full time received, on average, $584 per week, which was roughly a middle-level wage for all VET graduates in the survey.

It is expected that manufacturing employment will continue to grow over the next few years. Stronger employment growth is expected in non-metallic mineral products, metal products and in wood and paper products. Most forecasters believe there will be a reduction in employment in the textiles, clothing, footwear and leather products sector.

Chart 3.1: Manufacturing employment, Australia, November 1987–1997 (ABS labour force survey)



Source: ABS, *Labour force, Australia*, cat. 6203.0, 1987–1997

An industry snapshot

Manufacturing in Australia is a large and diverse industry, employing more than 1.1 million people. Despite comprising a smaller proportion of total jobs than during its ascendancy in the 1950s and 1960s, it is still the second largest employing industry in Australia behind retailing. While its employment level has fallen since the peak in the 1960s, over recent years employment in the industry has been rising again, spurred to some extent by growing markets for exports of Australian manufactured goods.

In 1994–1995 there were 69 400 businesses categorised as manufacturing, of which 67 900 were classified as small businesses. This means that the average size of a manufacturing establishment in Australia is just over 16 persons, larger than the average business across all industries, which is around nine to ten persons. Over 92% of those working in the industry are employees and almost 90% are full-time workers.

Manufacturing is the most important area of employment for persons born outside Australia. At the end of 1997 almost 400 000 persons born outside Australia were working in manufacturing, comprising 35% of the manufacturing workforce. Persons born outside Australia make up only 24% of the total workforce across all industries. Contrary to the prevailing view that manufacturing has an ageing workforce, the age structure of manufacturing generally reflects the overall pattern of the Australian workforce, apart from employing relatively fewer teenagers. This reflects the small number of part-time jobs in the industry.

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- Manufacturing is the second largest employing industry in Australia.
- Employment in manufacturing has grown by over 20 000 over the last three years.
- Manufactured goods make up more than 50% of our exports.
- The age structure of manufacturing is about the same as the total workforce.
- More than a third of all employees in manufacturing, almost 400 000 persons, were born overseas.

The decline in manufacturing's significance is not unique to the Australian economy. The same trend has been evident in the other Organisation for Economic Co-operation and Development (OECD) countries, with the more resource-based economies having experienced shifts similar in dimension to those occurring in Australia.[2]

While employment in the industry has declined since the 1960s, its overall level of real output is more than double what it was in the 1960s. The composition of the industry has changed over the last ten years, with industries such as metal products; petroleum, coal and chemical products; and food beverages and tobacco showing strong growth. Productivity ('total factor productivity') growth in the industry has been, however, below that of other OECD countries, averaging about 1.5% per year over the last 20 years, compared to 1.8% for the main OECD countries.

Trade in manufactured goods

Manufacturing makes up the major component of Australian exports, accounting for 51% in 1994–1995, or $43.7 billion (see table A3.3 in the appendix). However, this figure probably somewhat overstates the industry's overall contribution to the value-added component of exports.[3] In the decade to 1994–1995 the annual growth rate of Australian exports accelerated to 6.9%, compared with growth over the previous decade of only 3.7% per annum. Manufacturing accounted for almost two-thirds of this growth.

By 1994–1995, one quarter of sales by Australian manufacturers was exports. Strong exporters within the manufacturing sector have been metal products; food, beverages and tobacco; and machinery and equipment. About 18% of Australia's manufactured exports were sold to Japan, the largest single destination. Other major export markets were New Zealand, Singapore, Korea and the United States of America. A key feature

[2] Industry Commission, *The changing of Australian manufacturing*, 1996
[3] Industry Commission, *The changing of Australian manufacturing*, 1996, chapter 4

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in the growth of Australian manufactured exports has been the significant growth of 'elaborately transformed manufactures'. Table A3.3 in the appendix shows details of sector shares in exports and growth in elaborately transformed manufactures.

While the growth of exports to Asian markets has been a major boost to Australian manufacturing performance in recent years, this was largely a product of the rapid growth in the size of that market. Australia's share of Asian imports actually fell during the decade up to the early 1990s, where most of the competition came from other Asian exporters. Medium-size manufacturing establishments (with 50–99 employees) are least likely to be exporters, with only 11.1% of their sales exports. Large firms are most likely to export, with 16.2% of their sales being exports, followed by small firms, with 14.4% of their sales being exports.[4]

Of course, over the same period imports of manufactured goods also rose, accelerating the pace of structural change in the domestic manufacturing sector. Strongest import growth over the decade occurred in metal products; machinery and equipment; and in petroleum, coal, chemical and associated products.

Employment trends within manufacturing sub-divisions

Changing domestic demand and reduced levels of protection, coupled with a greater exposure to international markets have changed the composition of the manufacturing sector and hence its training needs. Over the last decade some parts of the industry have shown little or no employment growth, while other industry sub-divisions have shown quite strong growth. Some sub-divisions, especially metal products, have shown little employment growth but, through improvements in productivity, have shown growth in their share of total value added.

Sizeable falls in employment occurred in textiles, clothing and footwear and in machinery and equipment in the decade from the mid-1980s to the mid-1990s. Since then, overall employment in total manufacturing and employment in those sub-divisions previously showing little growth over the past decade has either stabilised or begun to grow. Chart A3.3 in the appendix shows details of employment trends in some of these sub-divisions over the last decade.

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The following table shows the level of employment in each manufacturing sub-division as at November 1997.

[4] ABS, *Manufacturing industry 1995–1996*, cat.8221.0

Table 3.1: Employment ('000s) in manufacturing by sub-division, by gender and type of employment, Australia, November 1997

Industry sub-division	Males	Females	Full-time	Part-time	Total
Food, beverage and tobacco manufacturing	119.9	58.6	155.5	23.0	178.5
Textile, clothing, footwear and leather manufacturing	37.4	59.5	81.3	15.6	97.0
Wood and paper product manufacturing	58.5	12.0	64.0	6.5	70.6
Printing, publishing and recorded media	73.4	54.1	100.8	26.7	127.6
Petroleum, coal, chemical and associated product manufacturing	66.8	31.2	91.7	6.2	97.9
Non-metallic mineral product manufacturing	38.3	6.3	40.4	4.2	44.5
Metal product manufacturing	153.2	28.8	170.5	11.5	182.0
Machinery and equipment manufacturing	210.9	45.9	238.3	18.5	256.8
Other manufacturing	61.9	20.8	70.0	12.6	82.7
Total	**820.4**	**317.2**	**1012.7**	**124.9**	**1137.6**

Source: ABS, *Labour force, Australia*, cat.6203.0, November 1997

Among these industry sub-divisions, only the textiles, clothing, footwear and leather manufacturing group employs a majority of women. A substantial proportion of these women are of a non-English-speaking background, presenting a specific set of training issues for this sub-division.

- Manufacturing accounted for about two-thirds of our export growth over the last decade.
- Exports and imports of manufactured goods have both grown strongly over the last decade.
- Machinery and equipment manufacture is the largest single employing area within manufacturing, employing more than 250 000 people.
- Women make up only 28% of the manufacturing workforce, but are the majority of workers in textiles, clothing and footwear.

Occupational composition

The following table shows the broad occupational groups employed within the manufacturing sector, and compares their percentage share with the total workforce.

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Table 3.2: Occupational profile, manufacturing and total workforce, Australia, November 1997

Occupation group	Manufacturing %	Total workforce %
Managers and administrators	7.9	7.6
Professionals	9.3	17.4
Associate professionals	5.0	10.5
Tradespersons and related	24.8	13.2
Advanced clerical and service	3.3*	4.5
Intermediate clerical/sales/service	9.7	17.1
Intermediate production/transport	19.5	9.2
Elementary clerical/sales/service	2.3*	10.5
Labourers and related	18.3	10.1
Total	**100.0**	**100.0**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, November 1997

Manufacturing employment clearly varies from the total workforce in several important respects. It employs a high proportion of trades and related workers, intermediate-level production and transport workers, and labourers and related. Conversely it employs a relatively small proportion of professionals and para-professionals. Consequently, manufacturing is substantially more reliant upon the VET sector for its skill requirements than most industries.

Qualifications profile

The following table compares the qualifications profile of manufacturing with the total workforce across all industries. It shows that manufacturing skills are concentrated in the skilled vocational area. 'Skilled vocational' is defined as courses generally lasting from two to four years, typically a trade certificate, leading to employment in a recognised trade or craft requiring a high degree of skill in a range of related activities.

In other than the skilled vocational area, manufacturing has a relatively less qualified workforce than the labour force as a whole. Manufacturing employs a relatively small proportion of university graduates and those with the higher vocational qualifications of diploma and associate diploma. Manufacturing also has a higher proportion of workers without a post-school qualification.

Full details of the qualifications of workers employed in manufacturing by minor occupational group as at the 1996 Census are provided in table A3.6 in the appendix, while summary data at the 1-digit occupational level is provided in table A3.4.

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Table 3.3: **Qualifications of manufacturing workers, percentage distribution, Australia, May 1997**

	Bachelor's degree or higher	Diploma/ associate diploma	Skilled vocational	Basic vocational	Without post-school qualification
Manufacturing	9.4	6.3	21.5	8.6	53.8
Total industry	**17.2**	**9.0**	**12.6**	**9.4**	**49.4**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

Occupational trends and skills shortages

As has been noted earlier, manufacturing is a diverse industry, ranging across activities from the simple processing of raw materials to the complex transformation of already complex components. Hence the range of skills used in the industry is similarly diverse.

While employment in manufacturing declined between 1987 and 1996, by November 1997 the level of employment in the industry was above the 1987 figure. The following occupational analysis is based on the period between 1987 and 1996 since, after that date, the Australian Bureau of Statistics (ABS) adopted the new version of the Australian Standard Classification of Occupations (ASCO) code.

In broad terms, over that decade the number of tradespersons in manufacturing declined by around 9% and machine operators and drivers declined by 17%. Increases occurred in the number of managers, professionals, para-professionals and salespersons, while the number of clerks and labourers remained fairly constant.

In the *trades* area in manufacturing, some of the main declines occurred in:

- metal fitting and machining—down about 20 000 jobs
  - in percentage terms big falls occurred for toolmakers (down 32%), metal fitters and machinists (down 23%), sheetmetal trades (down 26%)
- vehicle trades—down 5600
  - mechanics (down 19%), vehicle body makers (down 57%)
- electrical trades—down 3700
  - electrical fitters (down 49%) and electrical mechanics (down 29%)
- building trades—down 4400, mainly painters (down 60%)
- printing trades—down 4600
  - compositors (down 34%), binders and finishers (down 26%)
- other metal trades—down 3500

Some of these trades jobs lost were offset by a rise in the number of technicians, up by about 8200, and by a rise in the number of trades assistants, up 8000.

In the *white collar* area of manufacturing there was a redistribution of employment away from stenographers and typists (mainly typists, down 92%), whose numbers fell

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by 10 500, and from miscellaneous clerks, down 9400, towards data processing (up 6100) and numerical clerks, up 12 800. Sales representatives rose 9400 and sales assistants by 8200 (up 80%).

In other occupational areas, stationary plant operators and machine operators were down about 33 000 (with big declines in paper and in textiles/fabrics) and labourers declined by about 13 300.

When surveyed in the 1997 ESS, employers in manufacturing were about as likely as all employers surveyed to believe there were sufficient VET graduates to meet current needs. Of those surveyed in manufacturing, 66.8% said there were sufficient, while 26.5% said there were not; (6.7% could not say). Overwhelmingly, 72% of those who identified shortages (only just over a quarter of respondents) said they occurred in the trades area, although no further details were gathered.

The only significant rises in trades employment over the decade in manufacturing occurred in:

- welding
- screen printing
- baking and pastry cooking
- wood machining
- other wood trades
- upholstering and bedding
- garment trades

It is in these areas where shortages are most likely.

In light of the substantial reduction in the number of tradespersons in the industry, there needs to be further attention given to this issue. Is the reduction in the number of tradespersons largely a supply issue—that is, through insufficient numbers being trained via apprenticeships?

Alternatively, has the decline in the number of tradespersons reflected the changing skill demands of the industry? Thus, does the shortage reflect a residual of enterprises yet to adopt the technologies that have elsewhere displaced tradespersons? Or, has the pattern of demand changed away from metal trades towards wood and the other areas noted above, with the training system lagging in response to these changes?

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Shortages of skilled workers have been identified by the printing sub-division in binding and finishing, desktop publishing and non-trade pre-press workers. It is also likely that inadequate training on new high technology equipment is not allowing the use of such equipment to its full potential.

Hours of work and earnings

About 90% of jobs in manufacturing are full time, well above the level of 75% for the whole labour market. In November 1997 jobs in manufacturing were distributed by sex and hours worked as shown in the following table.

Table 3.4: **Manufacturing employment, by sex and hours worked, Australia, November 1997**

	Full-time ('000s)		Part-time ('000s)		Total ('000s)	
	No.	%	No.	%	No.	%
Males	782.0	77.2	38.4	30.7	820.4	72.1
Females	230.7	22.8	86.5	69.3	317.2	27.9
Total	**1012.7**	**100.0**	**124.9**	**100.0**	**1137.6**	**100.0**

Source: ABS, *Labour force, Australia*, cat.6203.0, 1997

As table 3.4 shows, over 72% of all workers in this industry are males, making manufacturing a relatively male-dominated industry. Males make up just under 57% of the total workforce at present. However, the masculinity ratio of the industry divisions varies widely, from mining, which is almost 89% male, to health and community services, of which only 22% are males.

At May 1996, manufacturing sector earnings averaged a little below all industries. Average adult full-time weekly earnings (at 38 hours per week) for that period were $710.60, against an all-industry average of $723.90. Part-time employees in manufacturing, however, earned above the all-industry part-time average, but as these figures are not adjusted for actual hours worked, the comparison is not meaningful between industries.

Geographical distribution of manufacturing

The geographical distribution of employment in the various sub-divisions and in manufacturing as a whole is not even across Australia. Manufacturing employment is still concentrated in New South Wales and Victoria which, together, account for 66% of all manufacturing employment, well above their combined share of the total labour force, which is 58%.

Table 3.5: **Employment ('000s) in manufacturing by State/Territory 1995**

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Males	269.1	251.6	137.5	76.1	65.6	17.1	2.5*	4.5
Females	98.5	95.4	47.3	24.3	20.4	4.8	0.5*	2.0*
Total	**367.7**	**347.0**	**184.7**	**100.4**	**85.9**	**21.9**	**3.0***	**6.5**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6204.0, 1995

Table A3.5 in the appendix provides details of employment by industry sub-division by State/Territory. (Note, the data reproduced in that table are based on a different collection method, a census of manufacturing establishments, than the data from the labour force survey quoted in table 3.5 above. Hence totals will not correspond.)

While New South Wales is the State with the largest number of jobs in manufacturing, as a proportion of total jobs, manufacturing is more significant to the labour markets of Victoria, South Australia and Tasmania. The smaller States are more

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likely to have manufacturing establishments in the food, beverages and tobacco sector, while in the larger States, printing and chemicals industries are more common. Victoria and South Australia have a high proportion of manufacturing employment in the machinery and equipment sub-division.

- Two-thirds of all manufacturing jobs are in New South Wales and Victoria.
- Victoria and South Australia are the States most reliant on manufacturing, with 16.9% and 15.3% respectively of their total employment in manufacturing.
- The Northern Territory and the Australian Capital Territory are least reliant on manufacturing jobs, with 3.8% and 4.1% respectively of their jobs in manufacturing.
- Proportions in the other States are: Tasmania 11.2%; New South Wales 13.4%; Queensland 12.3%; Western Australia 10.4%.

Training in manufacturing

Government support for training

The level of overall government support for manufacturing is difficult to gauge from the available statistical data, for at least two reasons. The 'training activity' categories used by the Australian National Training Authority (ANTA) include three separate areas that are predominantly manufacturing: food processing; textiles, clothing, footwear and furnishing; and process manufacturing. As well, ANTA groups engineering and mining together, much of which is likely to be training for basic manufacturing activities.

As well as these difficulties, it is clear that manufacturing, being such a large and diverse sector, employs a wide range of skills which are not specific to the industry, including professional, managerial, clerical and tradespersons. In 1996 ANTA estimated that just over 10% of total training activity (as measured in curriculum hours) would be in those areas noted above. (See table A3.1 in the appendix.) It needs to be kept in mind that less than 60% of hours were allocated to specific industry training areas—over 40% of government VET-funded activity was targetted at general education; business and clerical; and related general areas of training. On this basis, then, about one-sixth of industry-specific VET activity was targetted at manufacturing in 1996, close to manufacturing's overall share of employment.

Using the same data, it is estimated that 28 hours of government-funded VET was provided for each employed person in food processing, 39 hours per employed person

in textiles, clothing, footwear and furnishing, 40 hours for engineering and mining, and 11 hours per person in process manufacturing. In interpreting these figures it should be remembered that 91 hours per person were allocated for science, technical and other, and 58 hours for computing, skills which could be used in a number of industries, including manufacturing.

Employer satisfaction with VET

As noted earlier, the ESS showed employers in manufacturing to be among those relatively more satisfied with VET provision than most industries. Their average satisfaction score was 6.8 on a 10-point scale. This result was almost a replica of the overall satisfaction score achieved in the 1995 survey. In 1995, 73% of employers believed that VET skills acquired were relevant to their future needs, although a relatively high 42% believed that the VET system was not delivering skills appropriate to their current needs.

When asked which areas of VET were the highest priority for improvement, employers in manufacturing identified three areas in order:

i improving the relevance of course content

ii improving the work ethic of graduates

iii improving graduates' ability to work and cope with setbacks without supervision

- ❖ Manufacturing is a major customer of the VET system, with 36% of its workers having a VET qualification.
- ❖ Employers are generally quite satisfied with VET provision but a sizeable proportion say VET is not delivering skills appropriate to their current needs.

VET graduates in manufacturing

At the 1997 GDS, manufacturing was the third most common industry of employment. Of those graduates surveyed, 13.2% were working in manufacturing, making manufacturing only slightly less important as an employment destination than health and community services (14.2%) and retailing (13.9%). Compared with the 1995 GDS, a slightly higher proportion of graduates had found employment in manufacturing in 1997, up from 12.6% in 1995.

Graduates working in manufacturing surveyed in the GDS tended to be satisfied generally with their VET course. Graduates rated the relevance of their course to their employment quite highly, with over 50% rating the relevance as 'high' and a further 29% rating their course 'of some relevance'. This placed manufacturing sixth out of the 17 industries, according to the graduates' relevance rating.

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Generally, graduates working in manufacturing rated the various aspects of their course quite highly. For example, 83% of respondents in the 1997 GDS employed in manufacturing rated the quality of their course at least a 7 on a 10-point scale. This was about the same rating given by all employed graduates.

A relatively high proportion of graduates in manufacturing (about 22%), however, rated the provision of information on courses, subjects or modules as 5 or less on the same 10-point scale. Only 55% rated this item a 7 or better, below the 58.6% of all graduates giving a 7 or better on this issue. Perhaps related to the general issue of information provision, a markedly low 36% of graduates in manufacturing jobs gave a 7 or better to the provision of information on careers and jobs available. This was appreciably lower than the 41% of all graduates scoring this item a 7 or better.

Reflecting the distribution of manufacturing in Australia, about 75% of the graduates surveyed lived in New South Wales or Victoria. Also, reflecting the industry's occupational composition, the most common qualification held by the graduates surveyed was a trade certificate. In all, 1568 of the employed graduates had completed a trade certificate, indicating that they had completed an apprenticeship. The second most common qualification was a certificate (other), held by 1307 of the graduates. Combined, these two qualifications accounted for just under half of all the 5685 graduates surveyed who were working in manufacturing.

Moreover, it indicated that manufacturing was the second most significant destination for all apprentices completing their course. Only construction, with 1608 graduates with a trade certificate, employed more than manufacturing. On the other hand, manufacturing does not appear to be a major employer of trainees or former trainees.

For those graduates for whom getting a job was the main reason for undertaking their course, 67% of those working in manufacturing said that they had achieved their objective, slightly higher than the 65% of all employed graduates. For a substantial proportion of graduates in manufacturing, the main reason for undertaking their course was that it was a requirement of the job they were doing; again, this is probably related to the high incidence of apprenticeships in the industry. Almost all who gave this as their motivation said that they had achieved this outcome.

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Other important motivations were 'getting extra skills' or 'getting a better job or a promotion'. About half achieved the latter objective and about 75% achieved the former.

- Manufacturing was one of the main industries of employment for new VET graduates.
- Graduates generally rated the quality and relevance of their courses quite highly.
- Improvements seem to be needed in information provision on both courses and careers.

Employment outcomes

A relatively high proportion of all graduates working in manufacturing already had a job on graduation (73.4%), compared to all graduates surveyed (66%). Again reflecting the characteristics of the industry, over 90% of the graduates surveyed were working full time, well above the overall figure of 66% for all graduates in the survey. For more than half of those working, the job they were in at the time of the survey was not their first full-time job. This pattern was common across most industries.

Average weekly earnings for graduates surveyed were $557, with males earning $586 and females $474. This wide gap between male and female earnings was not uncommon across the industries surveyed for VET graduates. To some extent it might reflect a greater propensity for females to work part time. However, when full-time earnings for males and females are compared, substantial gaps are still evident. Full-time earnings for the male graduates surveyed working in manufacturing were $584 compared to $534 for females.

This income differential was probably about average for all industries. Some, such as mining, showed a much larger gap in male and female full-time earnings—$311. There was no industry where female full-time earnings equalled or exceeded male. However, in retailing the gap in favour of males was only $4. In part-time work there were several instances of female earnings exceeding male. However, as no comparison of actual part-time hours worked is possible from the data, it is not valid to draw any conclusions from this result.

Apprenticeships in manufacturing

Over the last three years manufacturing has been one of the three main industries employing apprentices. In 1995 and 1996 it was, in fact, the major employer of apprentices, as the following table shows:

Table 3.6: No. of apprentices ('000s) by industry of employment, Australia,1995–1997

Industry	1995	1996	1997
Manufacturing	**35.2**	**30.5**	**25.2**
Construction	26.3	27.5	23.2
Wholesale/retail	30.5	28.3	35.3
Accommodation/cafés/restaurants	5.7	8.8	13.7
Cultural/recreation/personal services	8.0	10.6	7.8
Other	13.5	20.6	15.9
Total	**119.2**	**126.3**	**121.1**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

The major trades represented in manufacturing and the numbers of apprentices in training in those trades in 1997 are shown in the following table.

Table 3.7: Main apprenticeship areas in manufacturing

Occupation group	Number in training, 1997
Metal fitting and machining	10 235
Other metal trades	9 690
Printing	3 160

Source: NCVER, Australian training statistics, September 1997 data collection

Employer support for training

Graduates who had been employed during their final semester of study in manufacturing were somewhat more likely to have received some form of support from their employer than had the average graduate. In fact, 63% of graduates working in manufacturing in their last semester received some form of support, compared to around 51% of all graduates. The support was most commonly the payment of fees or the provision of paid leave to attend classes.

The relatively high proportion of apprentices among these graduates would, in part, account for this higher-than-average level of employer support. Nearly half of the employed graduates surveyed who were employed in manufacturing were working with the same employer before beginning their course, during their course and at the time they were surveyed.

The ABS 1996 employer training expenditure survey (TES) showed manufacturing to be an industry with slightly above-average levels of employer support for structured training, with about 21.5% of employers surveyed providing training during the three-month reference period. On average across all industries, only 17.8% of employers provided training according to the TES.

Some areas of manufacturing, however, did not compare well with the average. Three sub-divisions of manufacturing showed below-average employer provision of training:

- printing, publishing and recorded media, with only 13.3% of employers providing training
- metal products, with 15.2% providing training
- non-metallic mineral products, with 16.4% providing training

The sample sizes upon which these estimates are based might not be reliable, so no firm conclusions should be drawn from these figures.

The employer TES of 1996 showed that employers in manufacturing allocated about 2.2% of their gross wages and salaries to structured training, below the all-industry average of 2.5%. However, manufacturing's total training expenditure per employee was slightly above average ($194 versus $185) as was its average hours of training per employee (5.4 hours versus 4.9 hours).

Despite manufacturing's relatively lower usage of structured training overall, manufacturing is still a relatively high user of apprenticeships. The TES shows that the

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highest category of structured training expenditure within manufacturing was on trade and apprenticeship training, averaging at 1.74 hours per employee. This was the third highest level of activity on trade and apprentice training on an industry basis, behind construction (2.22 hours on trade and apprenticeship training per employee) and the relatively small mining sector, with 3.65 hours per employee.

Compared with the 1993 TES, expenditure on training by manufacturing sector employers in 1996 was down substantially. In 1993 nearly 47% of employers in the industry were providing training and spent, on average, $205 per employee, compared with $194 in 1996. This equalled 2.63% of their gross wages and salaries. In absolute dollar terms, their expenditure fell from $184.3 million in 1993 to $161.4 million in 1996, a fall of 12.4%. Over the three years, training hours per employee fell from 6.55 hours in 1993 to 5.42 hours in 1996, or by 17.25%.

> Manufacturing sector employers reduced their expenditure on structured training by more than 12% between 1993 and 1996, and the average training hours per employee fell by over 17%.

At the industry sub-division level the largest declines in training expenditure occurred in textiles, clothing and footwear (down 41%), and in printing, publishing and recorded media (down 55%). Only three of the manufacturing sub-divisions recorded a rise in training expenditure over the three-year period: machinery and equipment (up 21%); wood and paper products (up 14%); and non-metallic mineral products (up 45%). Again, because of relatively small sample sizes at the industry sub-division level, these figures should be interpreted with caution.

Some training issues in manufacturing

- Manufacturing has a lower skills profile than the labour force as a whole. Is this a cause for concern or simply a valid reflection of the sector's skill mix?
- Why did 42% of employers in the 1997 ESS regard VET as not providing skills relevant to current needs?
- Is there a need to achieve more flexible working hours in manufacturing and, if so, what training implications would that have?
- What are the implications of structural change in manufacturing for future training needs?
- Why do some employers continue to identify skills shortages for tradespersons when the level of trades employment has fallen significantly over the last decade?
- How can we achieve a better fit between Australian and New Zealand Standard Industry Classification (ANZSIC)-based industry statistics and government-funded training activity statistics?
- How can the provision of information on courses, subjects and modules be improved?

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- What can be done to improve the level of information on careers and jobs in manufacturing?
- Is there a need for more, higher-level VET places in courses teaching generic management and supervisory skills in manufacturing?
- Can strategies other than 'training guarantee' type sanctions once again lift the level of industry-provided training in manufacturing?
- What level of cost-shifting has occurred from industry to government over the last five years in the provision of training for manufacturing?
- How can traineeship/new apprenticeship arrangements be promoted in manufacturing, and are they what is needed?
- Why do such large income differentials exist for male and female VET graduates in manufacturing?
- What specific strategies need to be developed to address training needs of the high level of workers from a non-English-speaking background in manufacturing?

Appendix

The following table is extracted from the ANTA resource allocations for 1997 document, available at their website. It shows the planned allocations of government-funded training between the ANTA-defined 'training areas' in terms of 'annual hours curriculum' (AHC).

Table A3.1: Key national shifts in activity between 1996 revised estimates and 1997 projected activity (AHC '000s)

Industry training area	1996 revised	1997 projected	Total increase	Total increase as % of 1996 revised	% of overall increase
Category A					
Arts, Entert, Sports and Rec	11 408	11 928	520	4.6	5.5
Automotive	8 221	8 576	355	4.3	3.7
Building and Construction	18 785	19 009	224	1.2	2.4
Comm Services, Health and Ed	20 910	22 382	1 471	7.0	15.5
Finance, Banking and Insurance	3 420	3 468	48	1.4	0.5
Food Processing	2 454	2 851	396	16.1	4.2
TCF and Furnishings	5 714	5 813	100	1.7	1.0
Communications	1 883	1 963	80	4.3	0.8
Engineering and Mining	15 654	16 607	952	6.1	10.0
Primary Industry	11 874	12 217	343	2.9	3.6
Process Manufacturing	397	479	82	20.6	0.9
Sales and Personal Service	6 527	6 752	225	3.4	2.4
Tourism and Hospitality	16 707	18 151	1 444	8.6	15.2
Transport and Storage	1 686	1 851	164	9.8	1.7
Utilities	11 898	12 145	247	2.1	2.6
Category B					
Business and Clerical	42 412	43 117	705	1.7	7.4
Computing	11 969	12 641	672	5.6	7.1
Science, Technical and Other	6 727	6 870	143	2.1	1.5
Category C					
Gen Education and Training	40 046	41 212	1 166	2.9	12.3
Unallocated	622	779	157	25.2	1.6
Total	**239 316**	**248 810**	**9 494**	**4.0**	**100.0**

Note: TCF – textiles, clothing and footwear

Source: Publications, *ANTA Resource Allocations 1997*, <www.anta.gov.au>

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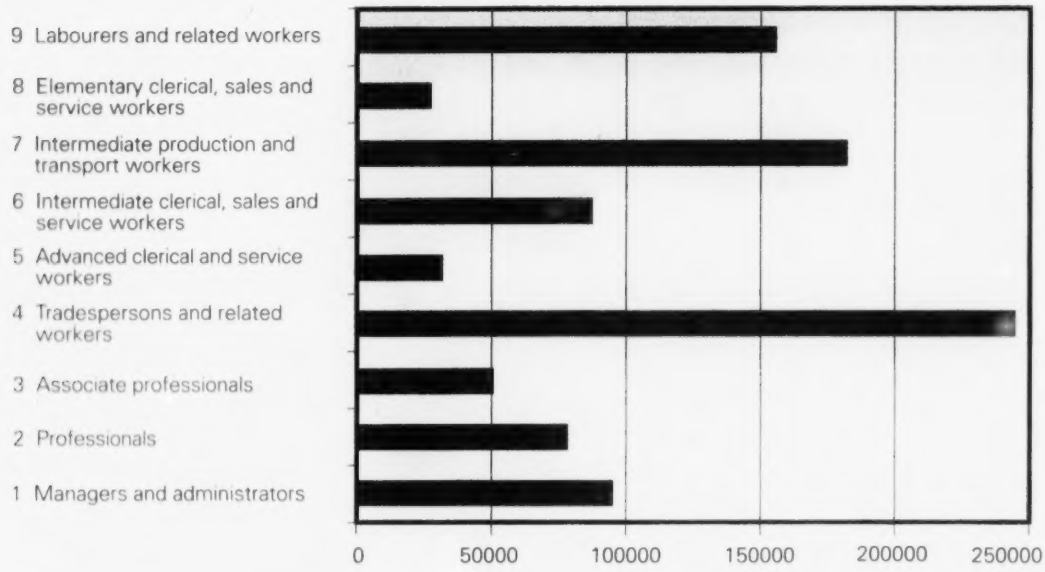
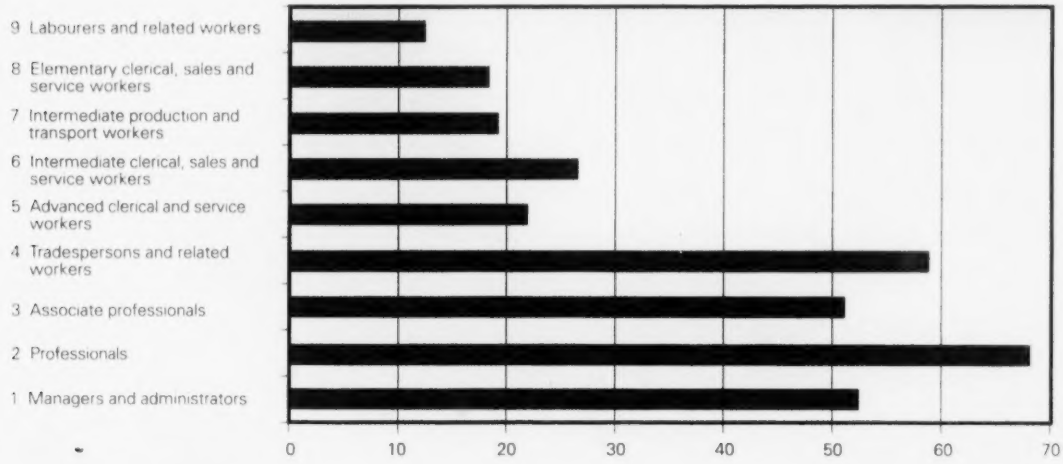
Chart A3.1: Employment in manufacturing by major occupational group, 1996 Census



Source: ABS, 1996 Census of population and housing, unpublished data

Chart A3.2: Manufacturing industry workers, % with qualifications, 1996 Census



Source: ABS, 1996 Census of population and housing, unpublished data

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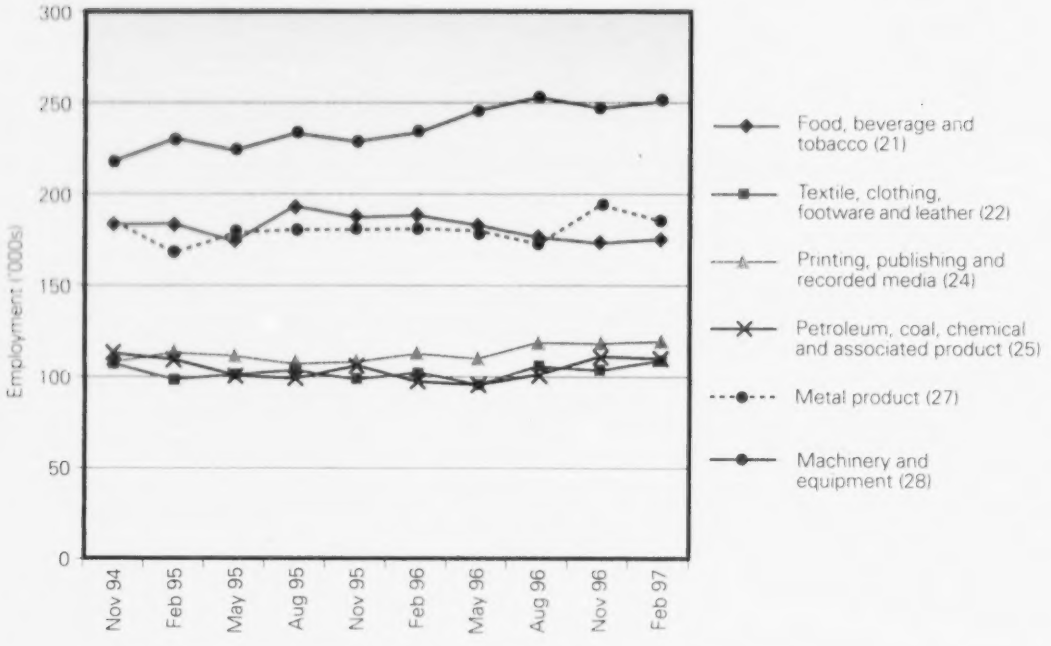
Chart A3.3: Employment in selected manufacturing sub-divisions, Australia 1994–1997 (ABS labour force survey)



Source: ABS, *Labour force, Australia*, cat.6203.0, 1994–1997

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Table A3.2: Employed persons by occupation in the manufacturing industry, 1987 and 1996

ASCO code and occupation	1987 ('000s)	1996 ('000s)	Change 1987 to 1996 ('000s)	Change 1987 to 1996 Average annual %
1201 General managers	10.0	12.2	2.2	2.3
1303 Sales and marketing managers	14.2	13.0	–1.2	–1.0
1305 Production managers	22.2	19.1	–3.1	–1.7
1399 Other specialist managers	1.6	3.7	2.1	10.1
1501 Shop managers	1.7	3.5	1.8	8.6
1601 Managing supervisors (other business)	22.9	30.0	7.1	3.1
2101 Chemists	4.7	3.9	–0.8	–2.1
2211 Electrical and electronics engineers	6.5	6.7	0.2	0.3
2213 Mechanical engineers	8.4	10.1	1.7	2.1
2701 Accountants	7.0	9.8	2.8	3.9
2707 Computing professionals	4.9	8.0	3.1	5.8
2805 Designers and illustrators	5.5	5.5	0.0	0.0
2807 Journalists	8.1	7.0	–1.1	–1.7
3103 Science technical officers and technicians	1.6	7.6	6.0	19.5
3201 Electrical and electronic engineering assoc./technicians	4.6	7.2	2.6	5.3
3205 Mechanical engineering associates and technicians	4.7	3.2	–1.5	–4.3
3913 Procurement officers	3.7	5.7	2.0	5.1
3999 Other para-professionals (including ex-service)	4.2	0.5	–3.7	–21.6
4101 Toolmakers	11.5	7.8	–3.7	–4.3
4103 Metal fitters and machinists	74.4	57.6	–16.8	–2.9
4203 Sheetmetal tradespersons	14.8	10.9	–3.9	–3.4
4205 Structural steel boilermaking/welding tradespersons	42.9	46.7	3.8	1.0
4211 Aircraft maintenance engineers	3.8	3.3	–0.5	–1.6
4213 Precision metal tradespersons	3.5	2.9	–0.6	–2.1
4303 Electrical fitters	4.9	2.5	–2.4	–7.4
4309 Electrical mechanics	14.2	10.1	–4.1	–3.8
4401 Carpenters and joiners	11.6	12.5	0.9	0.9
4405 Painters decorators and signwriters	5.3	2.1	–3.2	–10.0
4501 Compositors	6.8	4.5	–2.3	–4.6
4503 Graphic reproduction tradespersons	3.6	2.9	–0.7	–2.4
4505 Printing machinists	23.1	20.8	–2.3	–1.2
4507 Binders and finishers	3.5	2.6	–0.9	–3.3
4511 Screen printers	2.8	4.4	1.6	5.3
4601 Vehicle mechanics	6.9	5.6	–1.3	–2.4
4607 Vehicle body makers	4.4	1.9	–2.5	–9.2
4701 Meat tradespersons	8.6	5.4	–3.2	–5.2
4703 Bakers and pastrycooks	5.9	9.5	3.6	5.6
4901 Wood machinists and turners	4.9	5.4	0.5	1.1

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	1987 ('000s)	1996 ('000s)	Change 1987 to 1996 ('000s)	Change 1987 to 1996 Average annual %
4903 Cabinetmakers	18.7	19.2	0.5	0.3
4905 Other wood tradespersons	3.7	5.3	1.6	4.2
4911 Garment tradespersons	7.3	9.3	2.0	2.8
4913 Upholsterers and bedding tradespersons	4.7	7.8	3.1	6.0
4915 Shoemaking and repairing tradespersons	3.5	2.1	–1.4	–5.7
4999 Other tradespersons	2.8	5.7	2.9	8.5
5101 Office secretaries and stenographers	22.8	18.6	–4.2	–2.3
5103 Typists and typist-clerks	6.3	0.5	–5.8	–25.1
5201 Data processing machine operators	11.7	17.9	6.2	5.0
5301 Accounting clerks	42.6	55.6	13.0	3.1
5503 Transport recording and despatching clerks	6.6	5.0	–1.6	–3.1
5505 Stock and purchasing clerks	10.1	9.6	–0.5	–0.6
5601 Receptionists and information clerks	8.7	12.6	3.9	4.3
5999 Other clerks	11.5	1.3	–10.2	–22.1
6201 Sales representatives	24.6	34.0	9.4	3.8
6301 Sales assistants	10.2	18.4	8.2	7.0
7105 Truck drivers	20.1	17.9	–2.2	–1.3
7203 Forklift and related drivers	13.2	15.5	2.3	1.9
7305 Chemical plant operators	4.7	3.3	–1.4	–4.0
7311 Crane operators	4.0	3.7	–0.3	–0.9
7315 Furnace and kiln operators	4.2	5.2	1.0	2.5
7399 Other stationary plant operators	6.0	5.9	–0.1	–0.2
7401 Basic metal products machine operators	6.9	9.8	2.9	4.1
7403 Metal press operators	7.4	4.2	–3.2	–6.3
7405 Other metal products machine operators	4.5	2.7	–1.8	–5.7
7407 Plastics production machine operators	13.5	10.2	–3.3	–3.2
7409 Rubber production machine operators	3.8	3.2	–0.6	–1.9
7413 Wood processing machine operators	5.4	6.1	0.7	1.4
7415 Paper and paper products machine operators	6.8	3.5	–3.3	–7.3
7419 Clay and stone processing machine operators	3.9	2.7	–1.2	–4.1
7425 Fabric production machine operators	12.3	8.6	–3.7	–4.0
7427 Textile sewing machinists	38.3	28.2	–10.1	–3.4
7431 Food processing machine operators	15.4	13.0	–2.4	–1.9
7433 Packaging machine operators	8.9	7.3	–1.6	–2.2
7499 Other machine operators	4.0	3.6	–0.4	–1.2
8101 Trades assistants	13.2	11.2	–2.0	–1.9
8103 Assemblers	29.0	31.9	2.9	1.1
8105 Hand packers	21.3	27.5	6.2	3.0
8107 Industrial spray painters	3.6	3.4	–0.2	–0.7
8109 Quality controllers	16.1	15.0	–1.1	–0.8
8199 Other trades assistants and factory hands	94.7	100.9	6.2	0.7
8301 Cleaners	11.3	10.4	–0.9	–0.9

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	1987 ('000s)	1996 ('000s)	Change 1987 to 1996 ('000s)	Change 1987 to 1996 Average annual %
8907 Storemen/women	27.2	20.7	–6.5	–3.1
8919 Kitchenhands	3.6	2.6	–1.0	–3.7
8999 Other labourers and related workers	10.0	5.9	–4.1	–5.9
Other occupations	129.1	124.3	–4.8	–0.4
Total all occupations	**1132.1**	**1107.4**	**–24.7**	**–0.3**

Note: As estimates of less than 3500 are subject to high statistical error, they are listed against specific occupations only where there was a higher estimate in either 1987 or 1996. Where estimates of less than 3500 were recorded for both 1987 and 1996, they are included in the 'other occupations' category

Source: ABS, Labour force survey, unpublished data

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Table A3.3: Tables extracted from the Industry Commission publication *The changing of Australian manufacturing*, December 1996

Total exports of goods and services by sector—1994–1995-a,b

	Value ($b)	Share (%)
Services	20.4	20.2
Agriculture	6.9	8.4
Mining	14.9	18.5
Manufacturing	43.7	51.0
Total	**87.4**	**100.0**

Australia's exports of elaborately transformed manufactures (ETMs) (Australian-produce, current prices)

Category	Value 1994–95 ($m)	Share 1994–95 (%)	Trend annual growth 1984–85 to 1994–95 (%)	Contribution to growth 1984–85 to 1994–95 (%)
Non-metallic mineral manufactures	136	1.1	18.5	1.2
Iron and steel	775	6.2	10.0	5.1
Non-ferrous metal manufactures	790	6.3	13.1	5.7
Chemicals and chemical preparations	1 639	13.1	17.6	13.4
Other semi-manufactures	267	2.1	21.5	2.4
Machinery for specialised industries	1 597	12.8	17.3	13.2
Office and telecommunications equipment	1 399	11.2	28.6	13.1
Road motor vehicles and parts	915	7.3	14.9	6.7
Other machinery and transport equipment	2 974	23.8	16.2	23.9
Household equipment	554	4.4	9.7	3.6
Textile fabrics and made-up articles	336	2.7	16.3	2.8
Clothing and footwear	276	2.2	26.3	2.6
Miscellaneous manufactured articles	835	6.7	13.5	6.3
Total ETMs	**12 494**	**100.0**	**16.2**	**100.0**

Notes: a The sum of the components does not add to the total due to the exclusion of some confidential items

b Data are for total exports, and therefore include re-exports

Source: Department of Foreign Affairs and Trade, 1995; ABS, *Balance of payments and international investment position, Australia*, cat.5302.0 and unpublished ABS data

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Table A3.4: Educational attainment of employed persons by industry, occupation (1-digit ASCO) and type of post-school qualification at 1996 Census

Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
ASCO code and occupation									
1 Managers and Administrators	19 202	4 706	5 241	21 146	3 569	53 864	6 196	38 796	98 856
2 Professionals	31 095	4 838	6 648	9 091	2 659	54 331	4 440	21 224	79 995
3 Associate Professionals	5 318	1 918	4 788	12 123	2 701	26 848	3 740	20 692	51 280
4 Tradespersons and Related Workers	3 744	2 314	4 628	128 487	3 606	142 779	14 675	84 772	242 226
5 Advanced Clerical and Service Workers	1 458	1 087	1 137	1 041	2 453	7 176	3 687	18 923	29 786
6 Intermediate Clerical, Sales and Service Workers	4 708	2 121	3 295	8 392	4 301	22 817	6 478	55 706	85 001
7 Intermediate Production and Transport Workers	4 191	1 745	2 292	22 955	3 866	35 049	12 663	131 862	179 574
8 Elementary Clerical, Sales and Service Workers	1 031	481	504	2 035	779	4 830	2 054	18 560	25 444
9 Labourers and Related Workers	3 538	1 415	1 633	13 306	2 676	22 568	10 659	120 672	153 899
0 Inadequately described	477	176	361	3 643	292	4 949	1 123	8 085	14 157
Not stated	127	58	59	581	62	887	883	3 048	4 818
Not applicable	–	–	–	–	–	–	–	–	–
Total	**74 889**	**20 859**	**30 586**	**222 800**	**26 964**	**376 098**	**66 598**	**522 340**	**965 036**

Source: ABS, 1996 Census of population and housing

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Table A3.5: Employment in manufacturing, Australia, June 1996, by State/Territory

Industry sub-division	NSW No. empd ('000s)	%	Vic No. empd ('000s)	%	Qld No. empd ('000s)	%	SA No. empd ('000s)	%	WA No. empd ('000s)	%	Tas No. empd ('000s)	%	NT No. empd ('000s)	%	ACT No. empd ('000s)	%	Aust. No. empd ('000s)	%
Food/bev/tobacco	47.5	15.9	43.0	14.7	33.2	24.8	16.7	19.5	12.8	18.6	5.5	24.8	0.7	20.0	0.5	12.8	159.9	17.6
TCF	22.7	7.6	36.0	12.3	5.2	3.9	4.8	5.6	3.3	4.8	1.8	8.1	0.1	2.9	0.1	2.6	73.9	8.1
Wood and paper	19.6	6.6	17.1	5.9	10.2	7.6	5.7	6.7	4.1	6.0	3.8	17.1	0.2	5.7	0.3	7.7	61	6.7
Printing, publishing	34.4	11.5	29.5	10.1	11.0	8.2	5	5.8	6.1	8.9	1.9	8.6	0.5	14.3	1.7	43.6	90.2	9.9
Petroleum,coal/chem	32.3	10.8	34.1	11.7	9.7	7.2	5.9	6.9	6.4	9.3	0.7	3.2	0.1	2.9	0.0	0.0	89.1	9.8
Non-metallic min. prods	11.1	3.7	9.4	3.2	6.8	5.1	2.4	2.8	4.8	7.0	0.9	4.1	0.1	2.9	0.1	2.6	35.6	3.9
Metal products	51.8	17.4	36.5	12.5	25.1	18.7	11.3	13.2	15.2	22.1	3.4	15.3	1.3	37.1	0.3	7.7	145	16.0
Machinery and equipmt	63.2	21.2	71.2	24.4	23.5	17.6	29.3	34.3	10.8	15.7	3.2	14.4	0.4	11.4	0.5	12.8	202.2	22.3
Other mfg	15.2	5.1	15.2	5.2	9.1	6.8	4.5	5.3	5.3	7.7	1.0	4.5	0.2	5.7	0.4	10.3	50.9	5.6
Total	**297.9**	**100.0**	**292.1**	**100.0**	**133.9**	**100.0**	**85.5**	**100.0**	**68.7**	**100.0**	**22.2**	**100.0**	**3.5**	**100.0**	**3.9**	**100.0**	**907.7**	**100.0**

Note: TCF – textiles, clothing and footwear

Source: ABS, Manufacturing industry Census, *Manufacturing industry, Australia*, cat.8221.0, 1995–1996

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Table A3.6: Educational attainment of employed persons by industry, occupation (3-digit ASCO) and type of post-school qualification at 1996 Census

Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
ASCO code and occupation									
100 Managers and Administrators nfd	1 512	536	391	2 796	362	5 597	909	4 764	11 270
110 Generalist Managers nfd	3	0	0	11	0	14	3	14	31
111 General Managers and Administrators	3 008	695	516	2 124	343	6 686	688	3 705	11 079
119 Miscellaneous Generalist Managers	1 156	612	513	4 798	495	7 574	1 291	9 730	18 595
120 Specialist Managers nfd	424	105	103	274	71	977	78	502	1 557
121 Resource Managers	2 683	416	631	505	247	4 482	462	2 094	7 038
122 Engineering, Distribution and Process Managers	5 726	1 338	2 134	8 422	1 304	18 924	1 783	11 845	32 552
123 Sales and Marketing Managers	2 775	665	614	1 529	556	6 139	687	4 631	11 457
129 Miscellaneous Specialist Managers	1 737	270	282	469	136	2 894	178	575	3 647
131 Farmers and Farm Managers	178	68	56	218	54	574	118	936	1 628
200 Professionals nfd	415	39	66	79	38	637	46	227	910
210 Science, Building and Engineering Professionals nfd	3	0	0	3	0	6	0	3	9
211 Natural and Physical Science Professionals	2 934	214	403	106	167	3 824	142	424	4 390
212 Building and Engineering Professionals	8 205	817	1 768	2 869	303	13 962	724	2 034	16 720
220 Business and Information Professionals nfd	51	11	17	12	30	91	8	45	144
221 Accountants, Auditors and Corporate Treasurers	4 516	437	1 264	107	129	6 453	438	1 664	8 555
222 Sales, Marketing and Advertising Professionals	2 066	451	470	1 137	347	4 471	413	2 750	7 634
223 Computing Professionals	2 994	288	543	526	220	4 571	286	1 545	6 402
229 Miscellaneous Business and Information Profs	2 315	395	889	1 611	468	5 678	571	3 267	9 516
230 Health Professionals nfd	0	0	0	0	0	0	0	0	0
231 Medical Practitioners	59	5	5	5	4	78	7	15	100
232 Nursing Professionals	154	233	22	9	41	459	69	23	551

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Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
238 Miscellaneous Health Professionals	448	51	31	43	19	592	56	122	770
240 Education Professionals nfd	3	3	0	0	0	6	0	0	6
241 School Teachers	39	17	6	8	6	76	8	32	116
242 University and Vocational Education Teachers	32	13	3	20	7	75	11	30	116
249 Miscellaneous Education Professionals	89	40	15	54	17	215	37	153	405
250 Social, Arts and Miscellaneous Professionals nfd	5	3	0	0	0	8	0	3	11
251 Social Welfare Professionals	55	16	10	6	4	91	10	56	157
252 Miscellaneous Social Professionals	171	6	7	12	4	200	7	57	264
253 Artists and Related Professionals	6 051	1 586	991	2 220	782	11 630	1 468	8 324	21 422
254 Miscellaneous Professionals	491	216	138	263	100	1 208	138	452	1 798
300 Associate Professionals nfd	49	22	24	67	16	178	36	145	359
310 Science/Engineering and Related Assoc Profs nfd	157	32	177	262	54	682	44	214	940
311 Medical and Science Technical Officers	948	176	638	681	432	2 875	423	2 507	5 805
312 Building/Engineering Associate Professionals	780	331	2 111	4 097	512	7 831	609	2 343	10 783
320 Business and Administrative Assoc Profs nfd	0	0	3	0	0	3	0	7	10
321 Finance Associate Professionals	157	22	33	59	26	297	28	306	631
329 Miscellaneous Business/Admin Assoc Profs	2 024	712	1 147	2 297	936	7 116	1 337	8 453	16 906
330 Managing Supervisors (Sales and Service) nfd	5	3	0	5	0	13	3	10	26
331 Shop Managers	339	172	111	823	146	1 591	308	2 432	4 331
332 Hospitality and Accommodation Managers	57	54	25	403	41	580	88	577	1 245
339 Miscellaneous Mngr. Supervisors (Sales and Service)	643	262	287	2 209	241	3 642	437	2 914	6 993
340 Health and Welfare Assoc Professionals nfd	0	0	0	0	0	0	0	0	0
341 Enrolled Nurses	5	3	3	6	62	79	8	15	102
342 Welfare Associate Professionals	6	3	3	8	0	20	4	10	34
349 Miscellaneous Health and Welfare Associate Profs	41	57	130	854	102	1 184	286	222	1 692

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Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
390 Other Associate Professionals nfd	0	0	0	0	0	0	0	3	3
391 Police Officers	0	0	0	3	0	3	0	4	7
399 Miscellaneous Associate Professionals	108	70	99	346	130	753	130	532	1 415
400 Tradespersons and Related Workers nfd	100	55	203	2 294	100	2 752	242	1 132	4 126
410 Mechanical/Fabrication Engineering Trades nfd	0	0	5	152	4	161	24	48	233
411 Mechanical Engineering Tradespersons	860	497	1 608	35 971	597	39 533	2 941	10 713	53 187
412 Fabrication Engineering Tradespersons	295	172	300	24 653	657	26 077	2 772	15 553	44 402
421 Automotive Tradespersons	93	54	90	4 974	94	5 305	528	3 312	9 145
431 Electrical and Electronics Trades	353	151	1 034	11 312	266	13 116	658	3 072	16 846
440 Construction Tradespersons nfd	0	0	0	5	0	5	0	7	12
441 Structural Construction Trades	114	63	163	7 021	109	7 470	738	4 155	12 363
442 Final Finishes Construction Trades	52	35	34	954	56	1 131	172	1 254	2 557
443 Plumbers	4	6	19	969	11	1 009	69	298	1 376
451 Food Tradespersons	287	129	132	5 230	277	6 055	1 367	10 714	18 136
460 Skilled Agricultural/Horticultural Workers nfd	0	0	0	0	0	0	0	0	0
461 Skilled Agricultural Workers	6	6	5	39	15	71	25	215	311
462 Horticultural Tradespersons	12	14	18	106	23	173	32	476	681
490 Other Tradespersons and Related Workers nfd	3	5	5	45	4	62	23	116	201
491 Printing Tradespersons	504	357	296	14 271	478	15 906	1 742	10 137	27 785
492 Wood Tradespersons	432	276	236	12 779	276	13 999	1 471	10 528	25 998
493 Hairdressers	0	0	0	51	3	54	8	23	85
494 Textile, Clothing and Related Trades	274	283	282	3 035	293	4 167	1 026	7 343	12 536
498 Miscellaneous Tradespersons and Related Wkrs	350	210	197	4 626	345	5 728	836	5 676	12 240
500 Advanced Clerical and Service Workers nfd	3	0	0	4	0	7	0	6	13
511 Secretaries and Personal Assistants	637	666	618	529	1 946	4 396	2 743	11 869	19 008
590 Other Advanced Clerical and Service Wkrs nfd	0	0	0	0	0	0	0	3	3
591 Advanced Numerical Clerks	533	304	434	248	381	1 900	782	5 526	8 208
599 Miscellaneous Advanced Clerical and Service Wkrs	286	117	83	260	126	872	160	1 521	2 553

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Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
600 Intermediate Clerical, Sales and Service Wkrs nfd	18	6	12	29	19	84	17	160	261
610 Intermediate Clerical Workers nfd	3	0	0	3	3	9	3	23	35
611 General Clerks	510	328	414	562	742	2 556	1 248	10 755	14 559
612 Keyboard Operators	280	122	210	275	391	1 278	676	4 387	6 341
613 Receptionists	130	127	214	149	581	1 201	657	4 834	6 692
614 Intermediate Numerical Clerks	637	295	759	927	583	3 201	890	7 431	11 522
615 Material Record and Despatch Clerks	915	329	659	2 027	874	4 804	1 109	11 810	17 723
619 Miscellaneous Intermediate Clerical Workers	350	105	141	359	179	1 134	298	2 327	3 759
621 Intermediate Sales and Related Workers	1 783	754	836	3 857	861	8 091	1 429	13 127	22 647
630 Intermediate Service Workers nfd	0	0	0	0	3	3	3	6	12
631 Carers and Aides	26	19	17	127	21	210	47	261	518
632 Hospitality Workers	26	13	13	25	10	87	35	315	437
639 Miscellaneous Intermediate Service Workers	30	22	19	52	35	158	67	270	495
700 Intermediate Production and Transport Wkrs nfd	154	74	92	1 022	131	1 473	634	5 196	7 303
710 Intermediate Plant Operators nfd	25	8	13	298	48	392	106	1 132	1 630
711 Mobile Plant Operators	105	56	75	1 434	327	1 997	897	11 511	14 405
712 Intermediate Stationary Plant Operators	407	168	298	4 600	744	6 217	1 400	14 154	21 771
720 Intermediate Machine Operators nfd	1 302	443	487	4 465	645	7 342	3 212	30 012	40 566
721 Intermediate Textile/Clothing/Related Mach Ops	594	315	370	1 375	426	3 080	2 032	20 693	25 805
729 Miscellaneous Intermediate Machine Operators	483	214	282	2 964	366	4 309	1 349	14 019	19 677
731 Road and Rail Transport Drivers	113	83	105	2 618	261	3 180	891	11 536	15 607
790 Other Intermediate Prod'n and T'port Wkrs nfd	0	0	0	3	0	3	0	0	3
791 Intermediate Mining and Construction Workers	37	24	31	1 033	325	1 450	256	2 173	3 879
799 Misc Intermediate Prod'n and Transport Wkrs	973	360	538	3 143	592	5 606	1 886	21 434	28 926
800 Elementary Clerical, Sales and Service Wkrs nfd	3	0	3	7	3	16	9	69	94
811 Elementary Clerks	140	53	68	94	107	462	230	1 685	2 377
820 Elementary Sales Workers nfd	3	0	0	3	0	6	0	41	47

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Manufacturing	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
821 Sales Assistants	578	284	299	1 132	435	2 728	1 108	10 684	14 520
829 Miscellaneous Elementary Sales Workers	165	73	60	343	137	778	246	2 510	3 534
831 Elementary Service Workers	145	68	74	457	97	841	459	3 571	4 871
900 Labourers and Related Workers nfd	423	150	150	1 264	250	2 237	1 808	15 401	19 446
911 Cleaners	113	88	67	667	147	1 082	615	7 005	8 702
920 Factory Labourers nfd	23	9	6	26	10	74	35	447	556
921 Process Workers	1 884	694	922	7 743	1 401	12 644	5 322	63 609	81 575
922 Product Packagers	803	329	319	1 455	508	3 414	1 844	20 874	26 132
990 Other Labourers and Related Workers nfd	0	0	3	3	0	6	0	21	27
991 Mining, Construction and Related Labourers	52	30	29	627	74	812	245	3 604	4 661
992 Agricultural and Horticultural Labourers	60	33	38	316	98	545	198	2 734	3 477
993 Elementary Food Preparation and Related Wkrs	112	40	41	265	78	536	316	3 374	4 226
999 Miscellaneous Labourers and Related Workers	70	42	60	941	110	1 223	275	3 603	5 101
099 Inadequately described	477	176	361	3 643	292	4 949	1 123	8 085	14 157
Not stated	127	58	59	581	62	887	883	3 048	4 818
Not applicable	–	–	–	–	–	–	–	–	–
Total	**74 894**	**20 857**	**30 585**	**222 798**	**26 959**	**376 093**	**66 594**	**522 344**	**965 031**

Note: nfd – not further defined

Source: ABS, 1996 Census of population and housing

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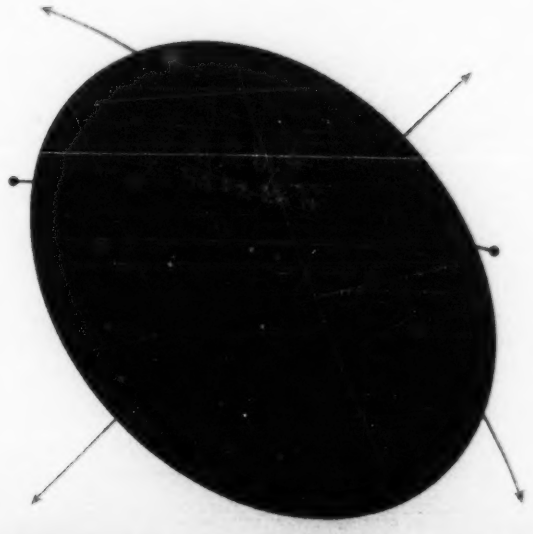

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